

CLAIMS

1. A Raman amplifier (4) for amplifying WDM radiation propagating along an optical fibre (3), said WDM radiation comprising a plurality of radiation components each having a selected waveband, the amplifier comprising: a plurality of optical radiation generating means (10, 11) operable to generate pump radiation of a selected wavelength (λ_1, λ_2) and power, said radiation being coupled into said fibre (3) to optically amplify the WDM radiation, characterised by the optical radiation generating means (10, 11) being wavelength tuneable and means (5) for measuring the power of the radiation components of the WDM radiation after it has propagated along the fibre (3) and has been amplified, wherein the wavelength and power of operation of the wavelength generating means (10, 11) are controlled in dependence upon the measured powers such as to make the measured powers substantially equal in magnitude and of a selected magnitude.
2. An amplifier according to Claim 1, in which the means (5) for measuring the power of the radiation components is operable to measure the power of all radiation components comprising the WDM radiation.
3. An amplifier according to Claim 1, in which the means (5) for measuring the power of the radiation components is operable to measure an average power over a number of radiation components for at least two groupings of components and wherein the wavelength and power of operation of the generating means are controlled in dependence upon the average powers such as to make the measured

average powers substantially equal in magnitude

4. An amplifier according to any preceding claim, in which the means (5) for measuring the power of the radiation components includes a wavelength selective component for spatially separating the WDM radiation into the radiation components.
5. An amplifier according to Claim 4, in which the wavelength selective component comprises a diffraction grating.
6. An amplifier according to Claim 5 in which the wavelength selective component comprises an arrayed waveguide device.
7. An amplifier according to any preceding in which each radiation generating means (10, 11) comprises a plurality of radiation sources (10a to 10c, 11a to 11c) each being operable to generate radiation having the same wavelength but with a different state of polarisation.
8. An amplifier according to Claim 7 and comprising three radiation sources (10a to 10c, 11a to 11c) operable to generate radiation whose state of polarisation is shifted by 60° to each other.
9. An amplifier according to Claim 8, and further comprising a polarisation maintaining multiplexer (10d, 11d) for combining the radiation from the radiation sources.

10. An amplifier according to any preceding claim in which the radiation generating means (10, 11) comprises a wavelength tuneable laser.
11. An amplifier according to any preceding claim, for amplifying C-band WDM radiation (1520 to 1565nm) and comprising at least two radiation generating means operating at selected wavelengths.
12. An amplifier according to any preceding claim, for amplifying L-band WDM radiation (1570 to 1620nm) and comprising at least three radiation generating means operating at selected wavelengths.